Bighorn National Forest Livestock and Vegetation Management for Six Geographic Areas

Economics and Social Report

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Introduction

This report discusses the current state of the social and economic environment affected within the analysis area containing the Livestock and Vegetation Management for Six Geographic Areas project. Effects to the current state of the social and economic environment that would occur from implementing one of the three alternative courses of action discussed in Chapter Two of the Environmental Impact Statement prepared for this project. Two types of economic analysis were done to estimate the effects. An economic efficiency analysis was done to analyze the costs and benefits to both the grazing permittee and to the Bighorn National Forest of each alternative. Additionally an economic impact analysis was conducted to analyze the impacts of the three alternatives in the local economy.

Overview of Issues Addressed

During the process of public scoping for this project several issues related to social and economic resources were identified. As part of the issue analysis process conducted by the interdisciplinary team for this project the various comments about economics were consolidated into the following issue statement:

There is a concern that the decisions based on this analysis could impact grazing permit holders. If numbers are reduced, it could impact permit holders by making it necessary for them to find additional land to graze on. They would need to be able to absorb the cost of the additional land.

There is concern that some of the permittees could not absorb the additional cost and actually go out of business. If ranches go out of business, it could impact the economy of the counties as well and change the social and aesthetic structure of the forest and the counties.

There is also a concern that livestock grazing will affect wildlife related expenditures (viewing and hunting). The thought is that if there are more livestock within these areas there could be less wildlife present to view and/or hunt. The less wildlife could mean less people going to the areas to hunt or view which could means less tourist revenue for the counties.

Issue Indicators

- Net Present Value
- Number of Jobs
- Labor Income

The economic efficiency analysis is used to produce the net present value. Jobs and income are a result of the economic impact analysis.

Affected Environment

Six sources of data were used in this analysis. Data from the US Bureau of Census (http://www.census.gov/) provides demographic data every ten years at the start of a new decade. The Economic Census is done on a five years basis with one done two years and one done seven years after the population census. Data from the National Agricultural Statistical Service (NASS)

(http://www.nass.usda.gov/) is used to model trends in agriculture such a livestock prices and livestock inventory. The Wyoming annual census of agriculture (http://www.agcensus.usda.gov/Publications/2007/Full_Report/Census_by_State/Wyoming/index.asp) provide data at the county level. The Minnesota Implan group (http://implan.com/v3/) provides data to use in the economic impact analysis model. The Forest Service Planning and Analysis group provides data for use in Implan and for use in Quicksilver. Finally the staff on the Bighorn National Forest provided the data used in the economic efficiency analysis.

Two different types of models were used in this analysis. A economic impact analysis and a economic efficiency analysis. A economic impact analysis was done for the five counties that border the Bighorn National Forest. An economic efficiency analysis was done for the grazing allotments within the project area.

An economic impact analysis measures the impact of changes in a geographic area using changes in inputs to estimate the effects on employment and income. Economic impact analyses are not usually done when analyzing the economic effects of project level decisions such as this project looking at grazing management. Economic impacts analyses are done as part of the process for the creation and revision of Forest Plans. Given the scale of this project, which is discussed subsequently, the economist at the Forest Service Planning and Analysis group were consulted to determine if the larger economic impacts should be examined as there is the potential for changes to operations in all of the counties bordering the Bighorn National Forest. The staff advised that an economic impact analysis was appropriate for this scale of project.

A economic efficiency analysis examines the detailed costs and benefits of management actions. The measure used in this analysis is Net Present Value which measures the present value of the cash flows associated with the operational management of the grazing allotments. The NPV shows the change in value of each alternative, allowing the decision maker to use the value to the government in making their decision.

Neither analysis considers the profitability of any specific livestock management firm that would result from the implementation of the alternatives considered by this project analysis. The data required to such an analysis would include but are not limited to such items as how the land and facilities for the firm were acquired, whether through inheritance or purchase, the status of facilities and the maintenance costs required or the number, size and quality of facilities that might be needed, the number of employees and the associated payroll requirement, the labor contributed by non-compensated labor such as family and volunteers, the amount of different types of feed purchased, the additional lines of business available to the firm, alterative investment opportunities as well as the local availability and price of additional pasture. Acquiring and analyzing this level of financial information about each firm involved in the livestock operations under consideration is outside of the scope of this analysis.

The impact analysis is done for current conditions as of 2008 as that is the most recent data available for analysis. The efficiency analysis is done with a twenty year time horizon as that is about twice the length of a standard grazing permit.

The 401,738 acre project area is distributed across the entire 1.1 million acre Bighorn National Forest. There are four counties in Wyoming and 1 county in Montana that are adjacent to areas analyzed for this project. The four Wyoming counties of Big Horn, Johnson, Sheridan and Washakie have some portion of the county that is part of the National Forest Systems lands. These four counties are on the eastern, western and southern boundary of the Bighorn National Forest. Bordering the forest to the north is Big Horn County, Montana.

Existing Condition

The allotments for this proposal are located in Sheridan, Big Horn, Johnson, and Washakie counties in Wyoming. Almost all of the private parties who hold the term grazing permits, (permittees) have mailing addresses within the four counties. There are 36 distinct individuals with grazing permits in the project area. The majority at 41% are located in Sheridan County. Twenty-eight percent of the permittees are located in Big Horn County, 3% have addresses in Johnson County, and 25% are located in Washakie County. Three percent of the permittees are located outside the 4-county area. Communities most likely to be impacted include Worland, Greybull, Lovell, Buffalo, Sheridan, Dayton, and Ranchester. Some residents of these communities depend upon a variety of forest resource-related activities and access to resources for their economic livelihood. These activities include ranching, hunting, fishing, and tourism-related activities.

Social

Grazing by domestic livestock has occurred on rangelands within the project area since the late 1800s. The industry has been an integral part of the local community economy, development, and lifestyle. The 'cowboy' image and culture has become the symbol, and a tourist/recreation draw, of the four-county Bighorn National Forest area.

Grazing by domestic livestock has occurred on rangelands within the project area since the late 1800s. The domestic livestock industry has been an integral part of the local community economy, development, and lifestyle in all of the Wyoming counties surrounding the project area. The western image and culture has become a major symbol used by the tourism industry of the four-county project area. As an example of this, the town of Sheridan was selected as a #1 Western Town in 2006.

Livestock grazing on the Bighorn National Forest provides a summer pasture for local livestock operators, with the Big 6 allotments currently providing approximately 34,799 permitted AUMs. Bighorn National Forest grazing provides several months of grazing for the permittees in their larger, year-long rotation system.

Domestic livestock operations utilize the forage on the Bighorn National Forest during the summer months. Operators bring livestock to the project area generally around the first weeks of July and remove the livestock around the first weeks of October. The actual begin and end dates are determined for each permit each year based on site specific conditions.

Permit holders pay an annual grazing fee for use of forage based on the number of livestock present on the allotment during the permitted period. The formula to calculate the grazing fee is prescribed by law and executive order. Permittees are required to abide by terms and conditions of their permit which address livestock and land ownership, rangeland improvements, resource concerns, management practices and requirements, etc. Implementation of required management practices and the long-term effects of livestock use on the environment are monitored, and adjustments are made, as needed, to assure compliance with permits and to address other resource concerns.

Some recreational horse use occurs on some of the allotments. Use of OHVs by the recreating public is common in most allotments. These uses can result in forage use and impacts to streams and vegetation that conflict with objectives and plans of term grazing permit holders. One common effect from recreation use occurs when Forest visitors open gates along NFS roads and trails to pass through and then do not close them. This allows livestock to drift into pastures,

allotments, roadways, or other areas where they are not intended to be and often results in unplanned livestock use and disruption of planned management.

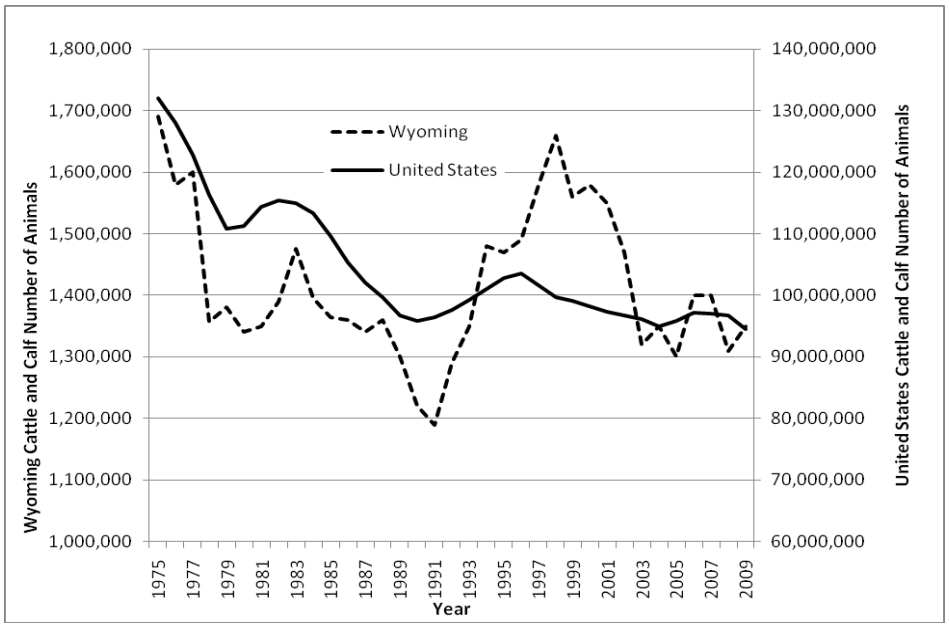
Grazing permits require permittees to keep livestock in designated areas. To comply, and to minimize the task of gathering and returning livestock, a rapid response is necessary, and can incur considerable expense to the responsible permit holder. This issue is of particular concern where access is limited and permittee response time to livestock concerns can be very time-consuming. Use of OHVs for recreation has increased immensely in recent years throughout the watershed, accelerating this problem and making livestock management throughout this area more difficult. In some cases, cattleguards can replace gates, but materials, installation, and maintenance are costly.

Livestock Operations

Livestock operations have been a part of the social and economic life of the five counties surrounding the Bighorn National Forest since the establishment of the forest. During that time the number of cattle and the economic value of livestock have varied.

Looking at the following graph showing the number of cattle in the United States and Wyoming since 1975, there is trend showing decreasing cattle inventories across the United States since 1975. The Wyoming cattle inventory is more volatile with number of cattle decreasing from 1975 to about 1990, then increasing almost up to the 1975 levels and since then the numbers are back down.

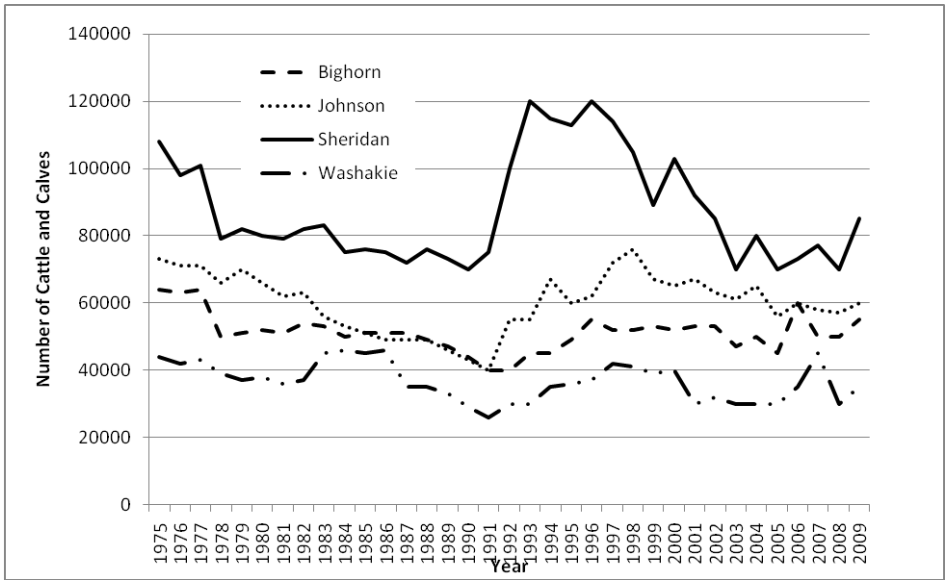
Cattle and Calf Inventory for United State and Wyoming 1975-2009



Source: USDA National Agricultural Statistics,, Wyoming Agricultural Statistics 2009

Looking at the cattle inventory for the four Wyoming counties adjacent to the forest show more volatility in the annual numbers but the trend is similar to the overall Wyoming trend. The cattle inventory in Sheridan County had show the largegst decline in cattle inventory since 1990, while the inventory for the other three counties have been more stable.

Cattle and Calf Inventory for Four Wyoming Counties 1975-2009

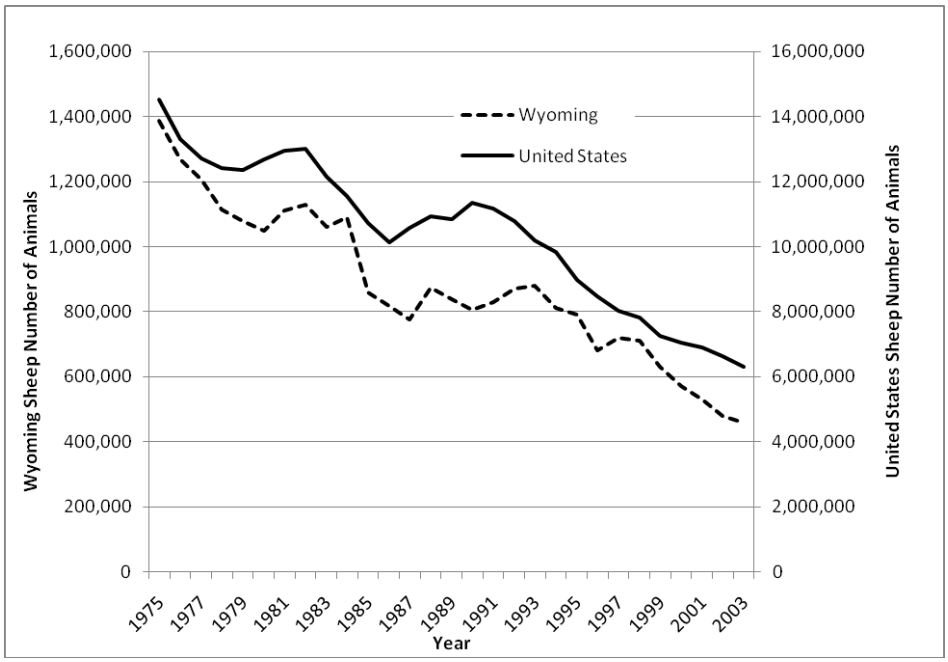


Source: USDA National Agricultural Statistics,, Wyoming Agricultural Statistics by county

Examining the same data for sheep inventory show a steeper downward trend. Data from 2003-2009 are not shown as the Wyoming Agricultural Statistics switched from reporting breeding sheep to all sheep sometime between 2003 and 2009.

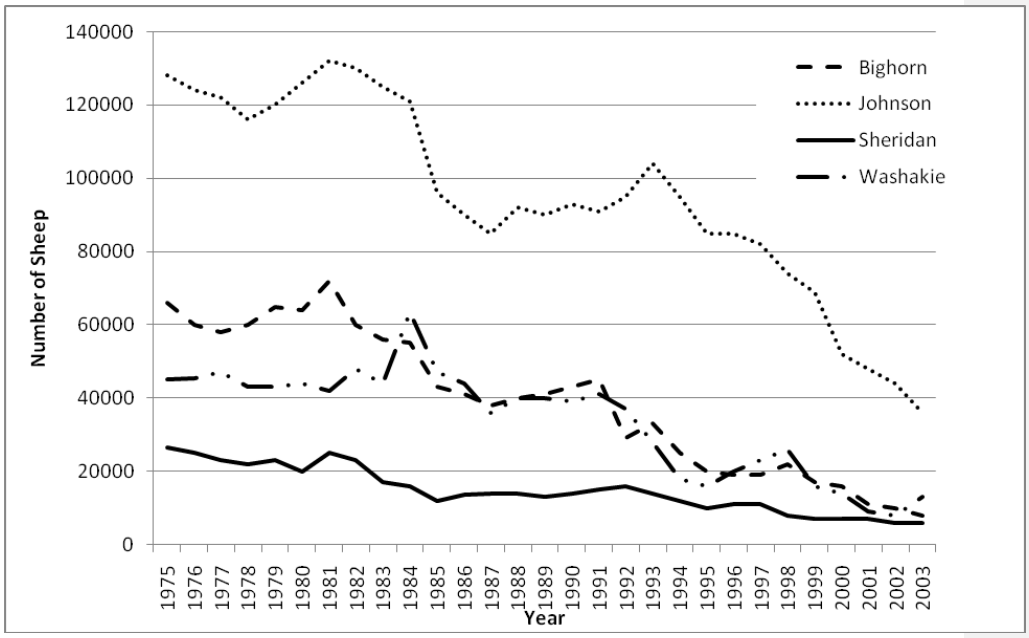
Since 1975 there has been a large decline in the number of sheep both nationally and in Wyoming. Total sheep inventories in 2003 are roughly a quarter of what they were in 1975. This trend is for all levels of sheep inventory, national, state and county.

Total Sheep Inventory for United State and Wyoming 1975-2003



Source: USDA National Agricultural Statistics,, Wyoming Agricultural Statistics 2009

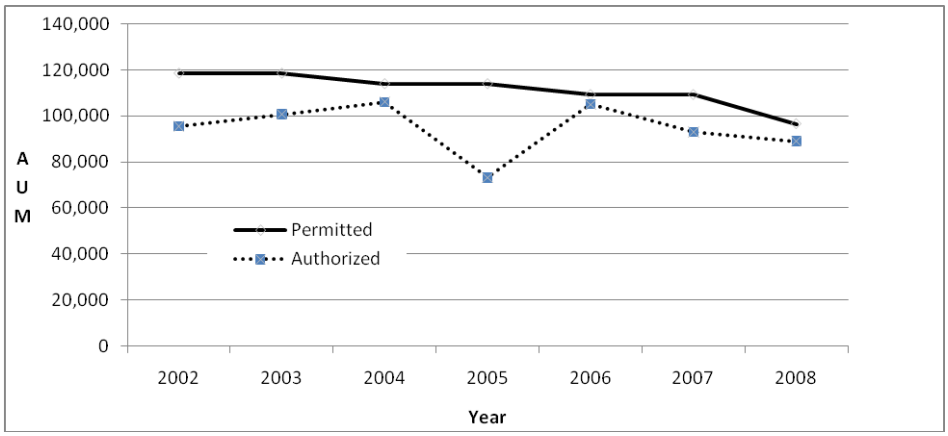
Breeding Sheep for Four Wyoming Counties 1975-2009



Source: USDA National Agricultural Statistics,, Wyoming Agricultural Statistics by county

The number of livestock grazed on the Bighorn National Forest since 2002 follows the national, state and local trends of a decrease in livestock numbers as shown in the following graph. There is an overall downward trend to the amount of livestock on the forest. The sharp decrease of authorized AUM in 2005 reflects the adjustments made in response to drought conditions. The decrease in permitted AUMs incorporates the changes made to permit numbers by the Tongue AMP update decision, the Battle Park and Misty Moon AMP update decision and the Piney AMP update decision.

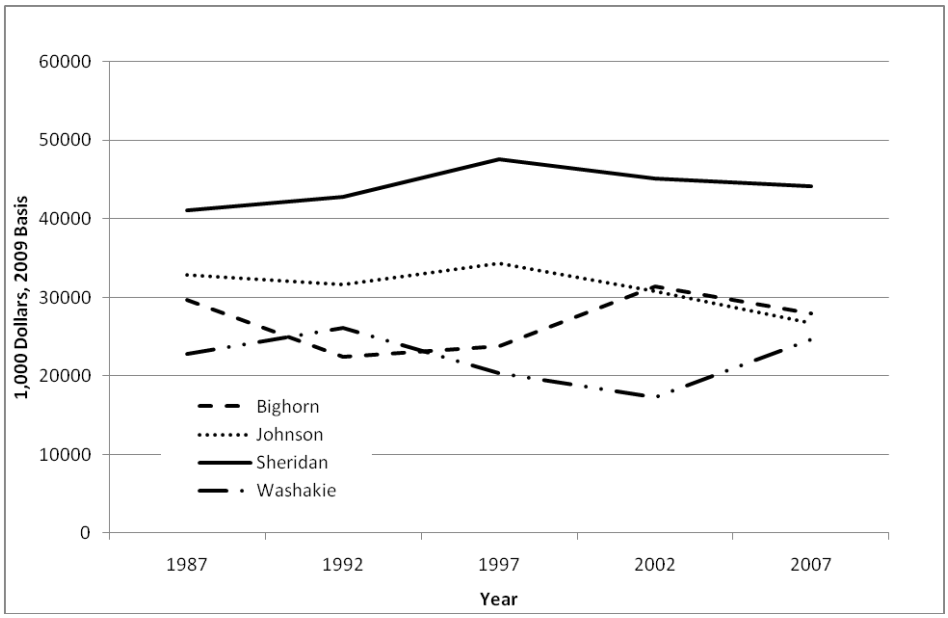
Total Permitted and Authorized AUM for Bighorn NF 2002-2008



Source: Bighorn National Forest

Another statistic to examine about the status of livestock operations is the revenue produced by the operations. Declining livestock numbers as discussed above do not necessarily indicate a decline in revenue as there has been a trend for an increase in livestock size. Market value data from the USDA National Agricultural Statistics Service, Wyoming Division for the four Wyoming counties adjacent to the Bighorn National Forest were examined. This data as shown in the following graph show a decline in market value of livestock in Sheridan, Johnson and Bighorn since 2002.

Market Value for Livestock Products for Wyoming Counties 1987-2007



Source: USDA National Agricultural Statistics, Wyoming County Data

Demographics

Data from the 1990 and 2000 US Census data for population, housing and employment in the four Wyoming counties adjacent to the Bighorn National Forest and the one Montana county adjacent to the Bighorn National Forest are shown in the following tables.

Total population in the five counties has increased from 1990 to 2000 except for Washakie county which had about a 1% decrease. During that same time period for Johnson, Sheridan and Washakie Counties the percentage of people over 65 has increased. Thus the number of people over 65 has increased faster than the overall increase in population.

Total Population and Population over 65 in the Five County Area

	Big Horn, WY	Johnson, WY	Sheridan, WY	Washakie, WY	Big Horn, MT
Population 1990	10,525	6,145	23,562	8,388	11,337
Population 2000	11,461	7,075	26,560	8,289	12,671
Percent Change	9%	15%	13%	-1%	12%
Median Age 2000	38.7	43	40.6	39.4	29.8
Percent Over 65 1990	17.4 %	17.5 %	14.9 %	13.9 %	8.9 %
Percent Over 65 2000	16.8 %	18.0 %	15.5 %	15.9 %	8.6 %

Source: US Bureau of Census, American Fact Finder

Housing shows the same trend as population with increases in all counties except for Washakie. Housing location in either urban or rural areas does not show a clear trend across the five counties. For Sheridan and Big Horn, MT counties there is an increase in the number of urban houses, while for Johnson and Washakie counties rural housing increase and for Big Horn, WY County there is no change.

Total Housing and Urban Housing in the Five County Area

	Big Horn, WY	Johnson, WY	Sheridan, WY	Washakie, WY	Big Horn, MT
Total Housing 1990	5,048	3,112	11,154	3,732	4,304
Total Housing 2000	5,105	3,503	12,577	3,654	4,655
Percent Change	1%	13%	13%	-2%	8%
Percent Urban 1990	0.0	52.3	58.1	67.4	30.3
Percent Urban 2000	0.0	49.3	62.8	67.3	31.7

Source: US Bureau of Census, American Fact Finder

Looking at employment in the five county area, the number of people who are available to work is defined by the Census as those individuals at least sixteen years old. The number of these individuals has increased between 1990 and 2000, reflecting the general increase in populations. The percentage employed has also increased in all counties except for Johnson. This increase is most likely related to the improved Wyoming and national economy between 1990 and 2000. One interesting thing to examine is the change in people employed by agriculture. For Sheridan and Johnson counties there was substantial decrease in the number of people employed by agriculture related jobs.

Employment in 1990 for the Five County Area

	Big Horn, WY	Johnson, WY	Sheridan, WY	Washakie, WY	Big Horn, MT
Person 16 years and Over 1990	7,713	4,671	17,951	6,222	7,600
Employed persons 16 years and over 1990	4,277	2,972	10,789	3,752	3,595
Percent 16 and Over Employed	55.4	63.6	60.1	60.3	47.3
Farming, forestry, and fishing occupations 1990	597	412	887	400	491
Percent employed in Farming, forestry, and fishing occupations 1990	7.7	8.8	4.9	6.4	6.5

Source: US Bureau of Census, American Fact Finder

Employment in 2000 the Five County Area

	Big Horn, WY	Johnson, WY	Sheridan, WY	Washakie, WY	Big Horn, MT
Person 16 years and Over 2000	8,602	5,626	21,015	6,309	8,680
Employed persons 16 years and over 2000	4,800	3,242	13,266	3,869	4,660
Percent 16 and Over Employed	55.8	57.6	63.1	61.3	53.7
Farming, forestry, and fishing occupations 2000	911	173	243	552	680
Percent employed in Farming, forestry, and fishing occupations 2000	10.6	3.1	1.2	8.7	7.8

Source: US Bureau of Census, American Fact Finder

Several of the prior data tables display decreases associated with the prevalence of livestock operations in the social and economic milieu of the areas surrounding the Bighorn National Forest. Indicators such as the decrease in livestock inventory, decreasing numbers of people employed by agriculture is decreasing and downward trends in the market value indicate a potential for a changing role for livestock grazing in the five counties adjacent to the Bighorn National Forest. Data from the 2010 Census and Wyoming Agricultural Statistics will need to be examined to further analyze the social and economic role of livestock grazing in the 5 county area.

Environmental Justice

This analysis is intended to evaluate some selected quantitative demographic indicators of minority populations and low-income populations of communities for purposes of assessing environmental justice (EJ) concerns in the project area. The following analysis only addresses indicators to determine the presence or absence of minority and/or low-income communities in a study area.

Concern for environmental justice stems from Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," signed February 11, 1994 by President Clinton. In this order (Section 1-101),

> *"each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States."*

The following table summarizes key demographic indicators of minority populations and low-income populations. While these indicators or the associated thresholds are not formally identified in federal codes and regulations, they serve as reasonable predictors of minority and low-income population status.

		Percent of 2000 total population							
Geographic Area	2000 Total population	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or more races	Hispanic or Latino (of any race)
Montana	902,195	90.6	0.3	6.2	0.5	0.1	0.6	1.7	2
Bighorn County, MT	12.671	36.6	0.0	59.7	0.2	0	0.7	2.8	3.7
Wyoming	493,782	92.1	0.8	2.3	0.6	0.1	2.5	1.8	6.4
Big Horn County WY	11,461	94.0	0.1	0.8	0.2	0.1	3.4	1.5	6.2
Johnson County, WY	7,075	97	0.1	0.6	0.1	0	0.6	1.6	2.1

Sheridan County, WY	26,560	95.9	0.2	1.3	0.4	0.1	0.8	1.3	2.4
Washakie County, WY	8,289	90.2	0.1	0.6	0.7	0	6.2	2.2	11.5

Source: US Bureau of Census, American Fact Finder

		Income in 1999 below poverty level	
Geographic Area	2000 Total population	Percent of population for whom poverty status is determined, all ages	Percent of Families in poverty status
Montana	902,195	16.4	10.5
Bighorn County, MT	12.671	31.2	23.7
Wyoming	493,782	12.4	8.0
Big Horn County WY	11,461	16.5	10.2
Johnson County, WY	7,075	10.1	7.2
Sheridan County, WY	26,560	14.6	8.6
Washakie County, WY	8,289	18.9	10.0

Source: US Bureau of Census, American Fact Finder

Minority Population

For the four Wyoming counties of Big Horn, Johnson, Sheridan and Washakie between 3 percent and 10 percent is non-white minority (or Black, Hispanic, Asian, Alaska Native, Native American, or some other race) and between 2 percent and 11 percent of the population is Hispanic or Latino. This is less than the Council on Environmental Quality (CEQ) threshold value of 50.0 percent, and within 5 percent of the State of Wyoming averages population. Big Horn County Montana does have a minority population over 50%. It is unlikely that a project completed in the project area would have disproportionately negative impacts on any minority population in the four Wyoming counties. There is a higher likelihood that minority populations would be impacted in Big Horn County Montana

Low-Income Population

The percent of individuals and families at or below the poverty level in the four Wyoming Counties of Big Horn, Johnson, Sheridan and Washakie are both less than the CEQ threshold value of 20 percent, though the poverty level of families with children under 18 of 18.9 percent in

Washakie County comes close. Looking at Big Horn County Montana, there are poverty levels above 20%. For the four Wyoming counties it is unlikely that a project completed in the project area would have disproportionately negative impacts on any low-income populations, thought impacts in Washakie County should be watched if the 2010 census shows an increase in the county poverty level. The high poverty level of Big Horn County Montana indicates a higher likelihood of negative impacts associated with decreases in revenues generated in the project area.

Conclusion

Based upon the review of demographic characteristics of the population of Big Horn, Johnson, Sheridan and Washakie Counties Wyoming and Big Horn County Montana and how they compare with suggested threshold levels for concern, there is an indication that the project area includes minority or low-income populations in Big Horn County that could be considered under the provisions of Executive Order 12898. Approximately 64% of Big Horn County Montana is in the Crow Indian Reservation and approximately 6% is in the Northern Cheyenne Indian Reservation. It can be inferred that the majority of the Native American population reside on these reservations. As these reservations are sovereign nations the Bighorn National Forest addresses their issues and concerns through a government to government consultation process that has a higher precedence than an Executive Order. Based on this no further EJ analysis was completed for this project.

Desired Condition

The law, policy and regulations governing the Forest Service recognize the economic impact of actions taken by the Forest Service. The National Forest Management Act of 1976 mandates that the Forest Service develop Forest Plans that

> *insure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish;*

The Bighorn National Forest 2005 Revised Forest Plan in the Goals and Objectives section states Objective 2.c as:

> *Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, value, products and services.*

The social and economic desired condition is for the management actions implemented to maintain or increase the social and economic value of the Bighorn National Forest.

Environmental Consequences

Methodology

Two types of economic analysis were conducted for this analysis. The Forest Service requires that an economic efficiency analysis of the alternative considered in NEPA analysis (FSM 1970.3). The other analysis done is a economic impact analysis. The impact analysis was done to address the issues identified during scoping.

Economic Efficiency

The Quicksilver software package was used to conduct the economic efficiency analysis. Input for the model was provided by resource specialists on the forest. Details on the exact values used are in the project record. The same set of costs for removing, constructing, and maintaining range improvements was used for all allotments. The number, location, and length (where applicable) of range improvements were derived from the GIS data for the project which is available in the project record. These costs were tracked at the allotment level. Several cost categories were tracked at the project level. Cost data used in this analysis is a mix of line items and aggregated costs. Cost items, such as monitoring or permit administration, use Forest Service salary costs as used by the agency for budgeting purposes. Other items (e.g., stock tanks) include the cost of materials, the cost to transport the materials to site, and the labor cost to install the materials.

Economic efficiency is an analysis approach that uses the monetary expression of some benefits and costs, while recognizing that other benefits and costs are best expressed in other terms. Costs expressed in dollar terms here include labor and materials. Benefits expressed in dollar terms here include grazing fees and the market value of forage. Other resources, commonly termed non market resources, are items such as watershed health, scenic quality, or wildlife habitat. These resources are not commonly involved in market transactions and therefore there is no readily available data on their dollar value. The value of non market resources are imputed by the willingness to pay for market resources that will produce certain levels of non market resources.

A discount rate of 4.00% was used. Prices are in terms of 2009 dollars. A grazing fee of $1.35 per Head Month for cattle and horse and $0.27 per Head Month for sheep. Grazing fees are set based on a formula established by Congress and Presidential Executive Order. The formula is not subject to change by the Forest Service.

A grazing benefit coefficient of $14.32 / Animal Unit Month was used. This value is determined by Forest Service Handbook FSH 2209.11. This value is updated annually by the Forest Service Washington Office using data collected by the National Agricultural Statistical Service. For 2010 this value is $13.51/AUM. The Region 2 regional economist uses data collected during the Resource Planning Act to further allocate this cost to sub areas within the region. For 2010, this value is $13.51/AUM for the Bighorn National Forest. The grazing benefit coefficient is a measure used in Forest Service economic analysis to impute the benefit to the permittee of the livestock utilizing NFS lands.

Head Month and AUM by Allotment

	Alternative 2 Permitted			Alternative 2 Actual			Alternative 3 Permitted	
Allotment	Head Month	AUM					Head Month	AUM
Antelope, Bear/Crystal Creek, Beaver Creek	4576	915		3955	791		4576	915
Babywagon	890	267		~~890~~900	~~267~~270		890	267
Big Goose	534	705		352	464		352	464
Dry Fork Ridge	305	402		277	366		305	402
Dry Tensleep	1371	1810		939	1239		1371	1810
Finger Creek	0	0		0	0		0	0

Fisher Mountain	50	60		46	56	50	60
Garnet	2753	826		2727	818	2753	826
Grouse Creek	0	0		0	0	880	264
Hazelton	2040	612		1878	563	2040	602
Hunt Mountain	0	0		0	0	2007	0
Lake Creek	~~1661~~2287	~~2192~~3018		~~948~~1227	~~1252~~1619	1227	1619
Leigh Creek	0	0		108	142	0	0
Little Goose	915	1208		441	582	658	868
Little Goose Canyon	104	137		103	136	104	137
Little Horn C&H	3229	4262		2129	2405	1485	1960
Little Horn S&G	2841	852		1527	458	2841	852
Lower Dry Fork	274	362		249	329	274	362
Mathew's Ridge	132	174		132	174	132	174
McClain Lake	0	0		0	0	0	0
Monument C&H	674	890		373	493	674	890
North Canyon C&H	2814	3715		1737	2293	2814	3715
Rapid Creek	1358	1793		745	9874	652	860
Red Canyon C&H	0	0		0	0	339	447
Red Canyon S&G	0	0		0	0	1107	332
Red Springs C&H	1480	1953		1118	1476	1036	1367
Rock Creek C&H	868	1146		728	962	868	1146
Sage Basin	579	764		491	648	579	764
South Canyon C&H	1422	1877		1275	1683	1422	1877
South Park	253	334		253	334	253	334
Spring Creek	0	0		0	0	0	0
Stull Lakes	0	0		0	0	0	0
Sunlight Mesa C&H	1039	1371		895	1126	1039	1371
Tensleep Canyon C&H	529	699		505	666	~~1422~~529	~~1877~~699
Tourist	60	72		82	98	60	72
Upper Meadows S&G	2130	639		1933	580	2130	639
Walker Prairie	1006	1328		598	789	772	1019
West Pass	448	591		336	443	448	443
Whaley Creek S&G	2777	833		2777	833	2777	833
Wiley Sundown C&H	878	1160		695	918	878	1160
Willow S&G	0	0		0	0	0	0
Wyoming Gulch C&H	644	850		761	732	644	850

One Time Costs

Cost	Value – 2009 Dollars	Units
Bridge Removal	$9,999.00	Each
Cabin Removal	$576.00	Each

Cost	Value – 2009 Dollars	Units
Cattleguard Construction	$4,250.00	Each
Cattleguard Removal	$100.00	Each
Corral Construction	$11,000.00	Each
Corral Removal	$1,470.00	Each
Cow Camp Removal	$10,000.00	Each
Fence construction	$8,650.00	Mile
Fence reconstruction	$8,650.00	Mile
Fence Removal	$4,687.07	Mile
Pipeline Construction	$8,020.00	Mile
Pipeline Removal	$420.00	Mile
Rain Trap Removal	$320.00	Each
Reservoir construction	$3,450.00	Each
Reservoir Removal	$1,370.00	Each
Spring development construction	$2,840.00	Each
Spring Development Removal	$1,370.00	Each
Stock Pond construction	$3,450.00	Each
Stock Pond Removal	$1,370.00	Each
Stock tank construction	$3,450.00	Each
Tank Construction	$2,840.00	Each
Tank Removal	$1,370.00	Each

Annual Costs

Cost	Value – 2009 Dollars	Units
Cattle Rider	$8,000.00	Each
Fence Maintenance	$170.00	Mile
Grass/sage Mechanical Treatment	$75.00	Acre
Grass/Sage Prescribed Burning	$50.00	Acre
Aspen Mechanical Treatment	$75.00	Acre
Aspen Prescribed Burning	$50.00	Acre
Timber Mechanical Treatment	$75.00	Acre
Timber Prescribed Burning	$100.00	Acre
Monitoring - Permanent Plot	$400.00	Day
Monitoring – Annual	$300.00	Day
Pipeline Maintenance	$157.00	Mile
Range permit admin	$250.00	Day
Reservoir Maintenance	$1,070.00	Each
Sheep Herder	$2,500.00	Each
Spike Moss Removal	$28.00	Acre
Spring Development Maintenance	$65.00	Each
Stock Pond Maintenance	$1,091.95	Each
Tank Maintenance	$65.00	Each
Truck Sheep	$5.00	Sheep

Annual Fuel Reduction Treatment Acres

Treatment	Acres
Grass and Sage Mechanical Treatment	75
Grass and Sage Prescribed Burning	500
Aspen Mechanical Treatment	20
Aspen Prescribed Burning	20
Timber Mechanical Treatment	50
Timber Prescribed Burning	500

Quantity for One Time Actions

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 1 - No Action	FS Antelope Ridge Bear Crystal Creek Beaver Creek						1	1			0.5														1							
Alt 1 - No Action	FS Big Goose				1		1				3.7												1									
Alt 1 - No Action	FS Dry Fork Ridge							1			2.5												5									
Alt 1 - No Action	FS Dry Tensleep			3							11		9.1					5													17	
Alt 1 - No Action	FS Finger Creek						1				1														4						1	
Alt 1 - No Action	FS Fisher Mountain																														1	
Alt 1 - No Action	FS Garnet										8.3																					
Alt 1 - No Action	FS Grouse Creek										2.6														1							
Alt 1 - No Action	FS Hazelton										8.3																					
Alt 1 - No Action	FS Hunt Mountain						1				0.3														2						1	
Alt 1 - No Action	FS Lake Creek							1			8.8												1									
Alt 1 - No Action	FS Leigh Creek										4.6																					
Alt 1 - No Action	FS Little Goose						1	1			14																					
Alt 1 - No Action	FS Little Goose Canyon										0.4																					
Alt 1 - No Action	FS Little Horn CH							1			8.1														1						3	

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 1 - No Action	FS Little Horn SG										0.1																				1	
Alt 1 - No Action	FS Lower Dry Fork							1			2.1												6									
Alt 1 - No Action	FS Mathews Ridge										0.8																					
Alt 1 - No Action	FS Monument										1.7		3.7					10													9	
Alt 1 - No Action	FS North Canyon							1			13		11					7													14	
Alt 1 - No Action	FS Rapid Creek		1					1			3.5		0.6																		1	
Alt 1 - No Action	FS Red Canyon CH										6.9		0.3														3				1	
Alt 1 - No Action	FS Red Canyon SG										0.1														1						1	
Alt 1 - No Action	FS Red Springs							1			6.9		0.6												11						14	
Alt 1 - No Action	FS Rock Creek						1	1			1.4																				3	
Alt 1 - No Action	FS Sage Basin							1			6.4														2						11	
Alt 1 - No Action	FS South Canyon							2			12		8.5			1															22	
Alt 1 - No Action	FS South Park							1			1														1		1				1	
Alt 1 - No Action	FS Sunlight Mesa							1			12												1		4						15	
Alt 1 - No Action	FS Tensleep Canyon										6.8		1.8					1													3	
Alt 1 - No Action	FS Upper Meadows	1									1.7																					
Alt 1 - No Action	FS Walker Prairie							1			2.3																					
Alt 1 - No Action	FS West Pass						1				1.1												2									
Alt 1 - No Action	FS Whaley Creek							1			2.4																				1	

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 1 - No Action	FS Wiley Sundown						2	1			1.9		0.6										1		6						4	
Alt 1 - No Action	FS Willow										2.1																					
Alt 1 - No Action	FS Wyoming Gulch							1			5.6														2							
Alt 1 - No Action - Phased 5	FS Antelope Ridge Bear Crystal Creek Beaver Creek						1	1																	1							
Alt 1 - No Action - Phased 5	FS Big Goose				1		1																1									
Alt 1 - No Action - Phased 5	FS Dry Fork Ridge							1																								
Alt 1 - No Action - Phased 5	FS Finger Creek						1				1																				1	
Alt 1 - No Action - Phased 5	FS Fisher Mountain																														1	
Alt 1 - No Action - Phased 5	FS Grouse Creek																								1							
Alt 1 - No Action - Phased 5	FS Hunt Mountain						1																								1	
Alt 1 - No Action - Phased 5	FS Lake Creek							1															1									
Alt 1 - No Action - Phased 5	FS Little Goose						1	1																								
Alt 1 - No Action - Phased 5	FS Little Horn CH							1																	1							

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 1 - No Action - Phased 5	FS Little Horn SG																														1	
Alt 1 - No Action - Phased 5	FS Lower Dry Fork							1																								
Alt 1 - No Action - Phased 5	FS North Canyon							1																							1	
Alt 1 - No Action - Phased 5	FS Rapid Creek		1					1																							1	
Alt 1 - No Action - Phased 5	FS Red Canyon CH																														1	
Alt 1 - No Action - Phased 5	FS Red Canyon SG																								1						1	
Alt 1 - No Action - Phased 5	FS Red Springs							1																							1	
Alt 1 - No Action - Phased 5	FS Rock Creek						1	1																								
Alt 1 - No Action - Phased 5	FS Sage Basin							1																								
Alt 1 - No Action - Phased 5	FS South Canyon							2								1																
Alt 1 - No Action - Phased 5	FS South Park							1			1														1		1				1	
Alt 1 - No Action - Phased 5	FS Sunlight Mesa							1															1									

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 1 - No Action - Phased 5	FS Tensleep Canyon																	1													
Alt 1 - No Action - Phased 5	FS Upper Meadows	1																													
Alt 1 - No Action - Phased 5	FS Walker Prairie							1																							
Alt 1 - No Action - Phased 5	FS West Pass						1																								
Alt 1 - No Action - Phased 5	FS Whaley Creek							1																							1
Alt 1 - No Action - Phased 5	FS Wiley Sundown							1															1								
Alt 1 - No Action - Phased 5	FS Wyoming Gulch							1																							
Alt 2 - Current Management	FS Antelope Ridge Bear Crystal Creek Beaver Creek																		3					1							
Alt 2 - Current Management	FS Big Goose																					1									
Alt 2 - Current Management	FS Dry Fork Ridge																					5									
Alt 2 - Current Management	FS Dry Tensleep																5														

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 2 - Current Management	FS Finger Creek																							4							
Alt 2 - Current Management	FS Grouse Creek																							1							
Alt 2 - Current Management	FS Hunt Mountain																							2							
Alt 2 - Current Management	FS Lake Creek																					1									
Alt 2 - Current Management	FS Little Horn CH																		2					1							
Alt 2 - Current Management	FS Lower Dry Fork																					6									
Alt 2 - Current Management	FS Monument																10														
Alt 2 - Current Management	FS North Canyon																7														
Alt 2 - Current Management	FS Red Canyon SG																							1							
Alt 2 - Current Management	FS Red Springs																							11							
Alt 2 - Current Management	FS Rock Creek																		2												
Alt 2 - Current Management	FS Sage Basin																							2							

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 2 - Current Management	FS South Park																							1							
Alt 2 - Current Management	FS Sunlight Mesa																					1		4							
Alt 2 - Current Management	FS Tensleep Canyon																1														
Alt 2 - Current Management	FS West Pass																					2									
Alt 2 - Current Management	FS Wiley Sundown																					1		6							
Alt 2 - Current Management	FS Wyoming Gulch																							2							
Alt 2 - Current Management - Actual	FS Antelope Ridge Bear Crystal Creek Beaver Creek																		3					1							
Alt 2 - Current Management - Actual	FS Big Goose																					1									
Alt 2 - Current Management - Actual	FS Dry Fork Ridge																					5									
Alt 2 - Current Management - Actual	FS Dry Tensleep																5														
Alt 2 - Current Management -	FS Finger Creek																							4							

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Actual																																
Alt 2 - Current Management - Actual	FS Grouse Creek																							1								
Alt 2 - Current Management - Actual	FS Hunt Mountain																							2								
Alt 2 - Current Management - Actual	FS Lake Creek																					1										
Alt 2 - Current Management - Actual	FS Little Horn CH																		2					1								
Alt 2 - Current Management - Actual	FS Lower Dry Fork																					6										
Alt 2 - Current Management - Actual	FS Monument																10															
Alt 2 - Current Management - Actual	FS North Canyon																7															
Alt 2 - Current Management - Actual	FS Red Canyon SG																							1								
Alt 2 - Current Management - Actual	FS Red Springs																							11								

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 2 - Current Management - Actual	FS Rock Creek																		2												
Alt 2 - Current Management - Actual	FS Sage Basin																							2							
Alt 2 - Current Management - Actual	FS South Park																							1							
Alt 2 - Current Management - Actual	FS Sunlight Mesa																					1		4							
Alt 2 - Current Management - Actual	FS Tensleep Canyon																1														
Alt 2 - Current Management - Actual	FS West Pass																					2									
Alt 2 - Current Management - Actual	FS Wiley Sundown																					1		6							
Alt 2 - Current Management - Actual	FS Wyoming Gulch																							2							
Alt 3 - Proposed Action	FS Antelope Ridge Bear Crystal Creek Beaver Creek								1										3					2					1			
Alt 3 - Proposed Action	FS Big Goose																					1									

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 3 - Proposed Action	FS Dry Fork Ridge																					11									
Alt 3 - Proposed Action	FS Dry Tensleep									2.8							5							1					1			2.2
Alt 3 - Proposed Action	FS Garnet								3.5																						
Alt 3 - Proposed Action	FS Hazelton								0.6												1	1									0.3
Alt 3 - Proposed Action	FS Hunt Mountain						1		0.1															2							
Alt 3 - Proposed Action	FS Lake Creek								0.7			1.8										1								1	
Alt 3 - Proposed Action	FS Little Goose			1																									1		
Alt 3 - Proposed Action	FS Little Horn CH																		2					3					2		0.6
Alt 3 - Proposed Action	FS Monument			5					0.1		0.5		2.8			1	10										5	2			4.8
Alt 3 - Proposed Action	FS North Canyon								2.5		0.1						7				3	3				12					3.9
Alt 3 - Proposed Action	FS Red Canyon CH																														1.3
Alt 3 - Proposed Action	FS Red Canyon SG																							1							
Alt 3 - Proposed Action	FS Red Springs																							11							
Alt 3 - Proposed Action	FS Rock Creek					1	1		1.6		0.6								2								12				0.3

Alternative	Partner - Allotment	Bridge Removal	Cabin Removal	Cattleguard Construction	Cattleguard Removal	Corral Construction	Corral Removal	Cow Camp Removal	Fence construction	Fence reconstruction	Fence Removal	Pipeline Construction	Pipeline Removal	Rain Trap Removal	Raintrap Removal	Reservoir construction	Reservoir Maintenance	Reservoir Removal	Site Mitigation	Spring development	Spring development construction	Spring Development Maintenance	Spring Development Removal	Stock Pond Maintenance	Stock Pond Removal	Stock Tank Construciton	Stock tank construction	Stock Tank Removal	Stockpond construction	Tank Construction	Tank Removal	Water pipelines
Alt 3 - Proposed Action	FS Sage Basin																							2			1					
Alt 3 - Proposed Action	FS South Canyon								8.9																		10					3.2
Alt 3 - Proposed Action	FS South Park																			1				2					1			
Alt 3 - Proposed Action	FS Sunlight Mesa								0.2		2.4											1		4							1	0.1
Alt 3 - Proposed Action	FS Tensleep Canyon								4		0.3						1										4					1.6
Alt 3 - Proposed Action	FS Walker Prairie								1.1												2									3		
Alt 3 - Proposed Action	FS West Pass																					2										
Alt 3 - Proposed Action	FS Wiley Creek						1		0.4		0.1			1	1					1		1		12					1			
Alt 3 - Proposed Action	FS Wyoming Gulch								0.8															2								

Quantity for Annual Actions

alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only) Tank Maintenance	Truck Sheep
Alt 1 - No Action	FS			26.5	30					
Alt 1 - No Action - Phased 5	FS			26.5	30					
Alt 1 - No Action - Phased 5	FS Antelope Ridge Bear Crystal Creek Beaver Creek									
Alt 1 - No Action - Phased 5	FS Big Goose									
Alt 1 - No Action - Phased 5	FS Dry Fork Ridge									
Alt 1 - No Action - Phased 5	FS Dry Tensleep									
Alt 1 - No Action - Phased 5	FS Finger Creek									
Alt 1 - No Action - Phased 5	FS Garnet									
Alt 1 - No Action - Phased 5	FS Grouse Creek									
Alt 1 - No Action - Phased 5	FS Hazelton									
Alt 1 - No Action - Phased 5	FS Hunt Mountain									
Alt 1 - No Action - Phased 5	FS Lake Creek									
Alt 1 - No Action - Phased 5	FS Leigh Creek									
Alt 1 - No Action - Phased 5	FS Little Goose									
Alt 1 - No Action - Phased 5	FS Little Goose Canyon									
Alt 1 - No Action - Phased 5	FS Little Horn CH									
Alt 1 - No Action - Phased 5	FS Little Horn SG									
Alt 1 - No Action - Phased 5	FS Lower Dry Fork									
Alt 1 - No Action - Phased 5	FS Mathews Ridge									
Alt 1 - No Action - Phased 5	FS Monument									

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only) Tank Maintenance	Truck Sheep
Alt 1 - No Action - Phased 5	FS North Canyon									
Alt 1 - No Action - Phased 5	FS Rapid Creek									
Alt 1 - No Action - Phased 5	FS Red Canyon CH									
Alt 1 - No Action - Phased 5	FS Red Canyon SG									
Alt 1 - No Action - Phased 5	FS Red Springs									
Alt 1 - No Action - Phased 5	FS Rock Creek									
Alt 1 - No Action - Phased 5	FS Sage Basin									
Alt 1 - No Action - Phased 5	FS South Canyon									
Alt 1 - No Action - Phased 5	FS Sunlight Mesa									
Alt 1 - No Action - Phased 5	FS Tensleep Canyon									
Alt 1 - No Action - Phased 5	FS Upper Meadows									
Alt 1 - No Action - Phased 5	FS Walker Prairie									
Alt 1 - No Action - Phased 5	FS West Pass									
Alt 1 - No Action - Phased 5	FS Whaley Creek									
Alt 1 - No Action - Phased 5	FS Wiley Sundown									
Alt 1 - No Action - Phased 5	FS Willow									
Alt 1 - No Action - Phased 5	FS Wyoming Gulch									
Alt 2 - Current Management	FS			53	20					
Alt 2 - Current Management	FS Antelope Ridge Bear Crystal Creek Beaver Creek				2		5	1		
Alt 2 - Current Management	FS Babywagon						5			
Alt 2 - Current Management	FS Big Goose				2		5			
Alt 2 - Current Management	FS Dry Fork Ridge				2		5			

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management	FS Dry Tensleep				2	9.1	5			17	
Alt 2 - Current Management	FS Finger Creek				2		5			1	
Alt 2 - Current Management	FS Fisher Mountain				2		5			1	
Alt 2 - Current Management	FS Garnet				4		5				
Alt 2 - Current Management	FS Grouse Creek				2		5				
Alt 2 - Current Management	FS Hazelton				2		5				
Alt 2 - Current Management	FS Hunt Mountain				2		5			1	
Alt 2 - Current Management	FS Lake Creek				2		5				
Alt 2 - Current Management	FS Leigh Creek				2		5				
Alt 2 - Current Management	FS Little Goose				2		5				
Alt 2 - Current Management	FS Little Goose Canyon				2		5				
Alt 2 - Current Management	FS Little Horn CH				2		5			3	
Alt 2 - Current Management	FS Little Horn SG		0.1		2		5			1	1200
Alt 2 - Current Management	FS Lower Dry Fork				2		5				
Alt 2 - Current Management	FS Mathews Ridge				2		5				
Alt 2 - Current Management	FS McClain Lake						0				
Alt 2 - Current Management	FS Monument				2	3.7	5			9	
Alt 2 - Current Management	FS North Canyon				2	10.5	5			14	
Alt 2 - Current Management	FS Rapid Creek				2	0.6	5			1	
Alt 2 - Current Management	FS Red Canyon CH				2	0.3	5			1	
Alt 2 - Current Management	FS Red Canyon SG				2		5			1	
Alt 2 - Current Management	FS Red Springs				2	0.6	5			14	

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management	FS Rock Creek				2		5			3	
Alt 2 - Current Management	FS Sage Basin				2		5			11	
Alt 2 - Current Management	FS South Canyon				2	8.5	5			22	
Alt 2 - Current Management	FS South Park				2		5			1	
Alt 2 - Current Management	FS Spring Creek						0				
Alt 2 - Current Management	FS Stull Lakes						0				
Alt 2 - Current Management	FS Sunlight Mesa				2		5			15	
Alt 2 - Current Management	FS Tensleep Canyon				2	1.8	5			3	
Alt 2 - Current Management	FS Tourist						5				
Alt 2 - Current Management	FS Upper Meadows				2		5				
Alt 2 - Current Management	FS Walker Prairie				2		5				
Alt 2 - Current Management	FS West Pass						5				
Alt 2 - Current Management	FS Whaley Creek				2		5			1	
Alt 2 - Current Management	FS Wiley Sundown				2	0.6	5			4	
Alt 2 - Current Management	FS Willow				2		5				
Alt 2 - Current Management	FS Wyoming Gulch				2		5				
Alt 2 - Current Management	Permittee	8									
Alt 2 - Current Management	Permittee Antelope Ridge Bear Crystal Creek Beaver Creek		0.5								
Alt 2 - Current Management	Permittee Babywagon							1			
Alt 2 - Current Management	Permittee Big Goose		3.7								
Alt 2 - Current Management	Permittee Dry Fork Ridge		2.5								
Alt 2 - Current Management	Permittee Dry Tensleep		10.8								

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only) Tank Maintenance	Truck Sheep
Alt 2 - Current Management	Permittee Finger Creek		1							
Alt 2 - Current Management	Permittee Fisher Mountain									
Alt 2 - Current Management	Permittee Garnet		7					1		
Alt 2 - Current Management	Permittee Grouse Creek		2.6							
Alt 2 - Current Management	Permittee Hazelton		8.3					1		
Alt 2 - Current Management	Permittee Hunt Mountain		0.3							
Alt 2 - Current Management	Permittee Lake Creek		8.8							
Alt 2 - Current Management	Permittee Leigh Creek		4.6							
Alt 2 - Current Management	Permittee Little Goose		14.4							
Alt 2 - Current Management	Permittee Little Goose Canyon		0.4							
Alt 2 - Current Management	Permittee Little Horn CH		8.1							
Alt 2 - Current Management	Permittee Little Horn SG							1		
Alt 2 - Current Management	Permittee Lower Dry Fork		2.1							
Alt 2 - Current Management	Permittee Mathews Ridge		0.8							
Alt 2 - Current Management	Permittee McClain Lake									
Alt 2 - Current Management	Permittee Monument		1.7							
Alt 2 - Current Management	Permittee North Canyon		13.2							
Alt 2 - Current Management	Permittee Rapid Creek		3.5							
Alt 2 - Current Management	Permittee Red Canyon CH		6.9							
Alt 2 - Current Management	Permittee Red Canyon SG		0.1							
Alt 2 - Current Management	Permittee Red Springs		6.9							
Alt 2 - Current Management	Permittee Rock Creek		1.4							
Alt 2 - Current Management	Permittee Sage Basin									

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management	Permittee South Canyon		11.8								
Alt 2 - Current Management	Permittee South Park		1								
Alt 2 - Current Management	Permittee Spring Creek										
Alt 2 - Current Management	Permittee Stull Lakes										
Alt 2 - Current Management	Permittee Sunlight Mesa		12.2								
Alt 2 - Current Management	Permittee Tensleep Canyon		6.8								
Alt 2 - Current Management	Permittee Tourist										
Alt 2 - Current Management	Permittee Upper Meadows		1.7					1			
Alt 2 - Current Management	Permittee Walker Prairie										
Alt 2 - Current Management	Permittee West Pass		1.1								
Alt 2 - Current Management	Permittee Whaley Creek		2.4					1			
Alt 2 - Current Management	Permittee Wiley Sundown		1.9								
Alt 2 - Current Management	Permittee Willow		2.1								
Alt 2 - Current Management	Permittee Wyoming Gulch		5.6								
Alt 2 - Current Management - Actual	FS			53	20						
Alt 2 - Current Management - Actual	FS Antelope Ridge Bear Crystal Creek Beaver Creek				2		5	1			
Alt 2 - Current Management - Actual	FS Babywagon						5				
Alt 2 - Current Management - Actual	FS Big Goose				2		5				
Alt 2 - Current Management - Actual	FS Dry Fork Ridge				2		5				
Alt 2 - Current Management - Actual	FS Dry Tensleep				2	9.1	5			17	
Alt 2 - Current Management - Actual	FS Finger Creek				2		5			1	
Alt 2 - Current Management - Actual	FS Fisher Mountain				2		5			1	

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management - Actual	FS Garnet				4		5				
Alt 2 - Current Management - Actual	FS Grouse Creek				2		5				
Alt 2 - Current Management - Actual	FS Hazelton				2		5				
Alt 2 - Current Management - Actual	FS Hunt Mountain				2		5			1	
Alt 2 - Current Management - Actual	FS Lake Creek				2		5				
Alt 2 - Current Management - Actual	FS Leigh Creek				2		5				
Alt 2 - Current Management - Actual	FS Little Goose				2		5				
Alt 2 - Current Management - Actual	FS Little Goose Canyon				2		5				
Alt 2 - Current Management - Actual	FS Little Horn CH				2		5			3	
Alt 2 - Current Management - Actual	FS Little Horn SG		0.1		2		5			1	1200
Alt 2 - Current Management - Actual	FS Lower Dry Fork				2		5				
Alt 2 - Current Management - Actual	FS Mathews Ridge				2		5				
Alt 2 - Current Management - Actual	FS McClain Lake						0				
Alt 2 - Current Management - Actual	FS Monument				2	3.7	5			9	
Alt 2 - Current Management - Actual	FS North Canyon				2	10.5	5			14	
Alt 2 - Current Management - Actual	FS Rapid Creek				2	0.6	5			1	
Alt 2 - Current Management - Actual	FS Red Canyon CH				2	0.3	5			1	
Alt 2 - Current Management - Actual	FS Red Canyon SG				2		5			1	
Alt 2 - Current Management - Actual	FS Red Springs				2	0.6	5			14	
Alt 2 - Current Management - Actual	FS Rock Creek				2		5			3	
Alt 2 - Current Management - Actual	FS Sage Basin				2		5			11	
Alt 2 - Current Management - Actual	FS South Canyon				2	8.5	5			22	

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management - Actual	FS South Park				2		5			1	
Alt 2 - Current Management - Actual	FS Spring Creek						0				
Alt 2 - Current Management - Actual	FS Stull Lakes						0				
Alt 2 - Current Management - Actual	FS Sunlight Mesa				2		5			15	
Alt 2 - Current Management - Actual	FS Tensleep Canyon				2	1.8	5			3	
Alt 2 - Current Management - Actual	FS Tourist						5				
Alt 2 - Current Management - Actual	FS Upper Meadows				2		5				
Alt 2 - Current Management - Actual	FS Walker Prairie				2		5				
Alt 2 - Current Management - Actual	FS West Pass						5				
Alt 2 - Current Management - Actual	FS Whaley Creek				2		5			1	
Alt 2 - Current Management - Actual	FS Wiley Sundown				2	0.6	5			4	
Alt 2 - Current Management - Actual	FS Willow				2		5				
Alt 2 - Current Management - Actual	FS Wyoming Gulch				2		5				
Alt 2 - Current Management - Actual	Permittee	8									
Alt 2 - Current Management - Actual	Permittee Antelope Ridge Bear Crystal Creek Beaver Creek		0.5								
Alt 2 - Current Management - Actual	Permittee Babywagon							1			
Alt 2 - Current Management - Actual	Permittee Big Goose		3.7								
Alt 2 - Current Management - Actual	Permittee Dry Fork Ridge		2.5								
Alt 2 - Current Management - Actual	Permittee Dry Tensleep		10.8								
Alt 2 - Current Management - Actual	Permittee Finger Creek		1								
Alt 2 - Current Management - Actual	Permittee Fisher Mountain										
Alt 2 - Current Management - Actual	Permittee Garnet		7					1			

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management - Actual	Permittee Grouse Creek		2.6								
Alt 2 - Current Management - Actual	Permittee Hazelton		8.3					1			
Alt 2 - Current Management - Actual	Permittee Hunt Mountain		0.3								
Alt 2 - Current Management - Actual	Permittee Lake Creek		8.8								
Alt 2 - Current Management - Actual	Permittee Leigh Creek		4.6								
Alt 2 - Current Management - Actual	Permittee Little Goose		14.4								
Alt 2 - Current Management - Actual	Permittee Little Goose Canyon		0.4								
Alt 2 - Current Management - Actual	Permittee Little Horn CH		8.1								
Alt 2 - Current Management - Actual	Permittee Little Horn SG							1			
Alt 2 - Current Management - Actual	Permittee Lower Dry Fork		2.1								
Alt 2 - Current Management - Actual	Permittee Mathews Ridge		0.8								
Alt 2 - Current Management - Actual	Permittee McClain Lake										
Alt 2 - Current Management - Actual	Permittee Monument		1.7								
Alt 2 - Current Management - Actual	Permittee North Canyon		13.2								
Alt 2 - Current Management - Actual	Permittee Rapid Creek		3.5								
Alt 2 - Current Management - Actual	Permittee Red Canyon CH		6.9								
Alt 2 - Current Management - Actual	Permittee Red Canyon SG		0.1								
Alt 2 - Current Management - Actual	Permittee Red Springs		6.9								
Alt 2 - Current Management - Actual	Permittee Rock Creek		1.4								
Alt 2 - Current Management - Actual	Permittee Sage Basin										
Alt 2 - Current Management - Actual	Permittee South Canyon		11.8								
Alt 2 - Current Management - Actual	Permittee South Park		1								
Alt 2 - Current Management - Actual	Permittee Spring Creek										

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 2 - Current Management - Actual	Permittee Stull Lakes										
Alt 2 - Current Management - Actual	Permittee Sunlight Mesa		12.2								
Alt 2 - Current Management - Actual	Permittee Tensleep Canyon		6.8								
Alt 2 - Current Management - Actual	Permittee Tourist										
Alt 2 - Current Management - Actual	Permittee Upper Meadows		1.7					1			
Alt 2 - Current Management - Actual	Permittee Walker Prairie										
Alt 2 - Current Management - Actual	Permittee West Pass		1.1								
Alt 2 - Current Management - Actual	Permittee Whaley Creek		2.4					1			
Alt 2 - Current Management - Actual	Permittee Wiley Sundown		1.9								
Alt 2 - Current Management - Actual	Permittee Willow		2.1								
Alt 2 - Current Management - Actual	Permittee Wyoming Gulch		5.6								
Alt 3 - Proposed Action	FS			53							
Alt 3 - Proposed Action	FS Antelope Ridge Bear Crystal Creek Beaver Creek				3		6	1			
Alt 3 - Proposed Action	FS Babywagon						6				
Alt 3 - Proposed Action	FS Big Goose				3		6		50		
Alt 3 - Proposed Action	FS Dry Fork Ridge				6		12				
Alt 3 - Proposed Action	FS Dry Tensleep				3	9.1	6			17	
Alt 3 - Proposed Action	FS Fisher Mountain				3		6			1	
Alt 3 - Proposed Action	FS Garnet				3		6				
Alt 3 - Proposed Action	FS Hazelton				3		6				
Alt 3 - Proposed Action	FS Hunt Mountain				3		6			1	
Alt 3 - Proposed Action	FS Lake Creek				3	1.8	6				

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 3 - Proposed Action	FS Leigh Creek				3		6				
Alt 3 - Proposed Action	FS Little Goose				3		6				
Alt 3 - Proposed Action	FS Little Goose Canyon				3		6				
Alt 3 - Proposed Action	FS Little Horn CH				3		6			3	
Alt 3 - Proposed Action	FS Little Horn SG		0.1		3		6			1	1200
Alt 3 - Proposed Action	FS Mathews Ridge				3		6				
Alt 3 - Proposed Action	FS McClain Lake						0				
Alt 3 - Proposed Action	FS Monument				3	3.7	6			14	
Alt 3 - Proposed Action	FS North Canyon				3	10.5	6			14	
Alt 3 - Proposed Action	FS – Tourist								50		
Alt 3 - Proposed Action	FS Rapid Creek				3	0.6	6		50	1	
Alt 3 - Proposed Action	FS Red Canyon CH				3	0.3	6			4	
Alt 3 - Proposed Action	FS Red Canyon SG				3		6			1	
Alt 3 - Proposed Action	FS Red Springs				3	0.6	6			14	
Alt 3 - Proposed Action	FS Rock Creek				3		6			15	
Alt 3 - Proposed Action	FS Sage Basin				3		6			12	
Alt 3 - Proposed Action	FS South Canyon				3	8.5	6			32	
Alt 3 - Proposed Action	FS South Park				3		6			2	
Alt 3 - Proposed Action	FS Stull Lakes						0				
Alt 3 - Proposed Action	FS Sunlight Mesa				3		6			15	
Alt 3 - Proposed Action	FS Tensleep Canyon				3	1.8	6			7	
Alt 3 - Proposed Action	FS Tourist						6				

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 3 - Proposed Action	FS Upper Meadows				3		6				
Alt 3 - Proposed Action	FS Walker Prairie				3		6				
Alt 3 - Proposed Action	FS West Pass						6				
Alt 3 - Proposed Action	FS Whaley Creek				3		6			1	
Alt 3 - Proposed Action	FS Wiley Creek				9	0.6	18			5	
Alt 3 - Proposed Action	FS Willow				3		6				
Alt 3 - Proposed Action	FS Wyoming Gulch				3		6				
Alt 3 - Proposed Action	Permittee	8									
Alt 3 - Proposed Action	Permittee Antelope Ridge Bear Crystal Creek Beaver Creek		1.5								
Alt 3 - Proposed Action	Permittee Babywagon							1			
Alt 3 - Proposed Action	Permittee Big Goose		3.7								
Alt 3 - Proposed Action	Permittee Dry Fork Ridge		4.6								
Alt 3 - Proposed Action	Permittee Dry Tensleep		13.6								
Alt 3 - Proposed Action	Permittee Fisher Mountain										
Alt 3 - Proposed Action	Permittee Garnet		10.5					1			
Alt 3 - Proposed Action	Permittee Hazelton		8.9					1			
Alt 3 - Proposed Action	Permittee Hunt Mountain		0.4								
Alt 3 - Proposed Action	Permittee Lake Creek		9.5								
Alt 3 - Proposed Action	Permittee Leigh Creek		4.6								
Alt 3 - Proposed Action	Permittee Little Goose		14.4								
Alt 3 - Proposed Action	Permittee Little Goose Canyon		0.4								
Alt 3 - Proposed Action	Permittee Little Horn CH		8.1								

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only) Tank Maintenance	Truck Sheep
Alt 3 - Proposed Action	Permittee Little Horn SG							1		
Alt 3 - Proposed Action	Permittee Mathews Ridge		0.8							
Alt 3 - Proposed Action	Permittee McClain Lake									
Alt 3 - Proposed Action	Permittee Monument		1.8							
Alt 3 - Proposed Action	Permittee North Canyon		15.7							
Alt 3 - Proposed Action	Permittee Rapid Creek		3.5							
Alt 3 - Proposed Action	Permittee Red Canyon CH		6.9							
Alt 3 - Proposed Action	Permittee Red Canyon SG		0.1							
Alt 3 - Proposed Action	Permittee Red Springs		6.9							
Alt 3 - Proposed Action	Permittee Rock Creek		3							
Alt 3 - Proposed Action	Permittee Sage Basin									
Alt 3 - Proposed Action	Permittee South Canyon		20.7							
Alt 3 - Proposed Action	Permittee South Park		1							
Alt 3 - Proposed Action	Permittee Spring Creek									
Alt 3 - Proposed Action	Permittee Stull Lakes									
Alt 3 - Proposed Action	Permittee Sunlight Mesa		12.4							
Alt 3 - Proposed Action	Permittee Tensleep Canyon		10.8							
Alt 3 - Proposed Action	Permittee Tourist									
Alt 3 - Proposed Action	Permittee Upper Meadows		1.7					1		
Alt 3 - Proposed Action	Permittee Walker Prairie		5.7							
Alt 3 - Proposed Action	Permittee West Pass		1.1							
Alt 3 - Proposed Action	Permittee Whaley Creek		2.4					1		
Alt 3 - Proposed Action	Permittee Wiley Creek		5.9							

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alternative	partner	Cattle Rider	Fence Maintenance	Monitoring - Permanent Plot	Monitoring - Seasonals	Pipeline Maintenance	Range permit admin	Sheep Herder	Spike Moss Removal (5 years only)	Tank Maintenance	Truck Sheep
Alt 3 - Proposed Action	Permittee Willow		2.1								
Alt 3 - Proposed Action	Permittee Wyoming Gulch		6.4								

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Heritage Resource Cost Estimate Tables
Alternative 1

Beaver Creek Alternative 1

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48BH196	Prehistoric	Stock Watering Causing Deflation	Relocate Stock Tank	Once a year Monitor = $364 x 2 years =$728	$728.00
48BH3588	Preh	Deflation	Relocate Stock Tank	Once a year Monitor = $364 x 2 years =$728	$728.00
48BH3736	Preh.	Erosion	Relocate Stock Tank	Once a year Monitor = $364 x 3 years =$1092	$1,092.00
48BH343	Cow Camp	Removal	MOA SHPO[1]	Photos, Context, Interpretive Sign-Report	$10,000
Year-End-Reports				Monitor Report –3 yrs.	$4,500
Initial Class I					$364.00
Additional Inventory Cost				Field Inspection $364 x 8 days= $2912	$2,912.00
Report documentation				$364 x 24 days	$8,736
Total:					***$29,060***

[1] Unit price decrease as number of sites included increases.

Little Horn Alternative 1

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48SH1739	Preh.	Stock Watering Causing Deflation	Relocate Stock Tank	Once a year Monitor = $364 x 2 years =$728	$728.00
48SH1740	Preh	Deflation	Relocate Stock Tank	Same day as above	$728.00
48SH1741	Preh	Deflation	Relocate Stock Tank	Same day as above	$728.00
48SH1744	preh	Deflation	Relocate Stock Tank	Once a year Monitor = $364 x 3 years =$1,092	$1,092.00
48SH1737	Cow camp	Removal	MOA SHPO	Photos, Context, Interpretive Sign-Report	$8,000
Year-End-Reports				Monitor Report –3 yrs.	$4,500
Initial Class I					$364.00
Additional Inventory Cost				Field Inspection $364 x 8 days	$2,912
Inventory Report				$364 x 24 days	$8,736
Total:					***$27,788***

Goose Alternative 1

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48SH6	Preh	Deflation/Small Areas of Overgrazing	Monitor	Once a year Monitor = $364 x 3 years =$1092	$1,092
48SH1543	Preh	Erosion—Rills /Overgrazing	Monitor	Once a year Monitor = $364 x 3 years =$1092	$1,092
48SH1547	Goose Cow Camp	Removal	MOA SHPO	Photos, Context, Interpretive Sign-Report	$5,000
Year-End-Reports				Monitor Report –3 yrs.	$4,500
Class I					$364
Additional Inventory Cost				Field Inspection $364 x 5 days= $1820	$1,820.00
Inventory Report				15 days x $364	$5,460
Total:					***$19,328***

Rocky Creek Alternative 1—***N/A*** = $0

Tensleep Alternative 1

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48WA2197	Preh	Erosion/ Overgrazing	Monitor 3yrs-	Once a year Monitor = $364 x 3 years	$1,092
48WA3	Preh	Erosion/ Congregation	Fence/Stock Tank, Monitor	Once a year Monitor = $364 x 3 years	$1,092
48WA388	Preh	Deflation	Monitor	Once a year Monitor = $364 x 3	$1,092
48WA392	Preh	Erosion/ Congregation	Relocate Tank / Monitor	Once a year Monitor = $364 x 3 years	$1,092
Canyon Creek 48WA2213	Historic Cow Camp	Removal	MOA SHPO[2]	Photos, Context, Interpretive Sign-Report	$4,000
Initaial Class I					$364.00
Year-End-Reports				Monitor Report –3 yrs.	$4,500
Additional Inventory Cost				Field Inspection $364 x 8 days	$2,912.00
Report				24 days x $364	$8,736
Total:					***24,880***
All Allotments					***$101,056***

[2] Cost is based on cumulative of all allotments, if by it self would run $10,000 ca.

Alternative 2 & 3

Beaver Creek

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48BH196	Prehistoric	Congregation/ Erosion	Move Stock Tank And Monitor	Once a year Monitor = $364 x 2 years	$728.00
48BH3588	Preh	Congregation/ Erosion	Move Stock Tank And Monitor	Once a year Monitor = $364 x 2 years	$728.00
48BH3736	Preh.	Congregation/ Erosion	Fence And Monitor	Twice a year Monitor = $728 x 3 years	$2,184
Documentation Yearly Report				$364 x 8 days x 2(yrs): $364 x 4 days x 1	$5,824 $1,456
Sub-Total:					**$10,920**
Veg Mgt Alternative 3 Only				**Action Item**	
Up- Dated- Class I				c. 5 Class I, 5 days at $364	$1,820
Inventory				5 Projects, 250acres per or 1,250. 50 acres per day = 25 days at$364 per day	$9,100
Report/Burn Plan/INFRA				50 days	$18,200
Sub-Total					**$29,120**
Totals:					**$40,040**

Little Horn Alternative 2 & 3

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48SH1739	Preh.	Deflation From Congregation at Tank	Relocate Stock Tank	Once a year Monitor = $364 x 2 years =$728	$728.00
48SH1740	Preh	Same	Relocate Stock Tank	Data Recovery	$25,000
48SH1741	Preh	Same	Relocate Stock Tank	Once a year Monitor = $364 x 2 years	$728
48SH1744	Preh	Same	Relocate Stock Tank	Same day as above	$728
Documentation Yearly Report				$364 x 6 days x 2(yrs);	$4,368
Sub-Total:					**$31,552**
Veg Mgt Alternative 3 Only				**Action Item**	
Up-Dated-Class I				c. 5 Class I, 5 days at $364 per day	$1,820
Inventory				5 Projects, c. 300 acres per or 1,500. 50 acres per day = 30 days at$364 per day	$10,920
Report/Burn Plan/INFRA				60 days	$21,840
Sub-Total:					**$34,580**
Total:					**$66,132**

Goose Alternative 2 & 3

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48SH6	Preh	Deflation-Overgrazing In A Few Small Areas	Monitor	Monitor 3 yrs.=$1092 & tree placement $1,000—ca. 3 days	$2,092
48SH1543	Preh	Erosion/ Overgrazed	Fence, Monitor	Monitor, 1,800	7,600
Total:					**$9,200**
Veg Mgt Alternative 3 Only				***Action Item***	
Up-Dated- Class I				2 days x $364 per day	$728
Inventory				c. 300 acres at 50 per day = 6 x $364	$2,184
Report/Burn Plan/INFRA				14 days	$5,096
Sub-Total:					**$8,008**
Goose Total:					**$17,208**

Rocky Creek—N/A

Tensleep

Allotment Name/ Smithsonian #	**Site Type**	**Direct/Indirect Impacts**	**Mitigation Measures**	**Data Recovery/Other Cost**	**Total Cost**
48WA2197	Preh	Deflation From Congregation at Tank/Salt	Relocate Tank & Salt-- Monitor	Once a year Monitor = $364 x 2 years	$728.00
48WA3	Preh	Deflation, Overgrazing	Monitor, Fence, Water	Twice a year Monitor = $728 x 3 years	$2,184
48WA388	Preh	Deflation	Fence, Monitor	Twice a year Monitor = $728 x 3 years =$2184	$2,184
48WA392	Preh	Deflation From Congregation at Tank	Fence, Relocate Tank, Monitor	Once a year Monitor = $364 x 2 years =$728	$728.00
Documentation Yearly Report				$364 x 24 days	$8,736
TensleepTotal:					**$14,560**
Goose					**$17,208**
Beaver					**$40,040**
Little Horn					**$66,132**
Rock Cr-N/A					
Tensleep					**$14,560**
All Totals					$137,940

Cost of mitigation is based on 2010 estimates plus 5% for inflation from outside contracts on similar task, passes cost from projects completed by Forest Service personnel, or quotes from supplier.

a. Buck and pole fence equals $6 per ft.,
b. Bar-wire fence-- $1.50 per ft.,
c. Electric fence--$.50 per ft.,
d. Carbon sample (C-14) $320 each,
e. Float samples (FS) $120 each,
f. Pollen analysis (PA) $170 each,
g. Geomorphology analysis (GA) $1000 per site,
h. Obsidian analysis (OA) $100 each, and
i. Data recovery equals $2,000-2,400 ca. per cubic meter excavated or GS rate x days
j. Unknown special skilled person or analysis (SP)

Impact Analysis

The Implan model and FEAST model were used to perform the economic impact analysis. Implan is a input/output model developed by the Minnesota Implan Group. FEAST is a model developed by the Forest Service to apply Implan results to the alternatives considered in the NEPA analysis. Data used are the 2008 data provided by the Minnesota Implan Group to the Forest Service.

The data files for these models are in the project record. The Implan model and data are not subject to FOIA requests as per Department of Justice.

Perspectives on the Importance of Grazing NFS Lands

Although most ranches in the West are only partially dependent on federal grazing land for forage, this forage source is often a critical part of their livestock operation. Greer (1994) and Taylor et al (1982) both found that while the reliance of ranchers on forage from federal land grazing can appear relatively unimportant when calculated on an acreage or animal-unit-month (AUM) basis, they become quite important when calculated on a seasonal dependency basis. The rigidity of seasonal forage availability means that the optimal use of other forages and resources are impacted when federal AUMs are not available. Dozens of researchers over the last 25 years (Torell et al (2002). Bartlett(1983), Gee (1983), Hahn et al (1989), Bartlett et al (1979), Gee (1981), Perryman and Olson (1975), Rowe and Bartlett (2001), Torell et al (1981), and Van Tassell and Richardson (1998)) have found that potential reductions in income and net ranch returns are greater than just the direct economic loss from reductions in federal grazing. Because ranching operations have economic linkages with other sectors of the area's economy, changes in federal grazing can also have implications for the overall economy.

Results from ranch level analyses suggest that there are at least three possible approaches to evaluating the economic importance of federal grazing to local communities: 1) evaluating federal AUMs only, 2) evaluating federal AUMs and the effects on total ranch production, and 3) evaluating federal AUMs and their effect on the economic viability of the ranch operation. Taylor, et al (2005) found in Park County, Wyoming that the effects of federal grazing to the local economy were roughly twice as large when considering total ranch production compared to federal AUMs only. From the perspective of ranch viability, effects to the local economy were roughly twice as large compared to total ranch production, or four times larger than federal AUMs only. Which of these approaches is the most relevant in a particular situation depends on a number of factors including the individual ranch's level of dependency on federal grazing, the magnitude of the proposed change in grazing, the financial solvency of the ranch, the availability of alternative sources of forage, and the desire of the rancher to remain in ranching. Limited information regarding some of these factors is available and discussed below. Other information is unavailable or beyond the scope of this analysis.

Although a definitive assessment is not possible for this analysis, it is recognized that adjustments to federal grazing, whether in terms of AUM reductions or cost increases to permittees, can have important consequences to individual ranch operations and ranch viability, as well as implications to families, social structure, lifestyle, local economies, and land use.

Alternatives

Incomplete and Unavailable Information

To do a full economic analysis of the decision one more alternative should have been considered. Alternative 3 has the same amount of livestock and the addition of capital in the form of range improvements to achieve certain resource conditions as described elsewhere. From an economic perspective the alternative where there was no capital added but where inputs were changed to achieve the same resource conditions should have been analyzed. However such an alternative was not considered by the ID team.

Alternative 1 – No Action

Direct Effects

For alternative 1, the economic efficiency model assumes all improvements associated with livestock management are immediately removed. The only exception to this is the removal of permanent structures – cow camps – used by the permittee under the terms of the permit. These were assumed to be removed 2 years after the decision to allow for the cultural survey work to be done and for cultural resources inventory report to be written and submitted to the Wyoming State Historic Preservation Office (SHPO). A continuing cost in alternative 1 is the re-measurement of the 265 benchmark sites located within the project area. Using a 10-year cycle, there would be 26.5 plots per year visited and measured per year.

The following two tables display the direct economic efficiency effect and economic impacts of alternative 1. An economic efficiency analysis examines the detailed costs and benefits of management actions. An economic impact analysis uses changes in inputs to estimate the effects on employment and income.

The first table displays the cost of removing improvements under two scenarios: improvements removed the first year and improvements removed after several years. For the second scenario, costs were modified by assuming that fences would be removed over a five year period, starting in year 1 and other improvements would be removed, one per year, until all improvements were gone. Cow camps were assumed to be removed in year 3.

Whether done immediately or over the course of several years, it is expensive to remove all of the range improvements. A substantial amount of infrastructure – fences, water systems, and camps –has been built over many years.

The economic impacts table shows the net contribution of jobs and income into the local economy of the Big Horn, Johnson, Sheridan, and Washakie counties in Wyoming and Big Horn County in Montana. This alternative contributes zero grazing jobs, seventy five jobs related to recreational visits which include wildlife viewing, zero jobs for work to restore ecosystems and two Forest Service jobs. The Forest Service jobs do not contribute labor income as those jobs are already present in the economy thus do not bring new or additional dollars into the local economy.

In response to the issue that livestock grazing will affect wildlife related expenditures (viewing and hunting), there is no change between the alternatives. This is because changes in grazing management, including structural improvements and reduction of AUMs; and,

changes due to the vegetation treatments of sagebrush burning, conifer encroachment and aspen treatment will not change the number of visitor days or related expenditures. This is because the limiting factor to local wildlife populations is winter range, not summer forage and habitat. In addition, big game herds across the Bighorn have consistently been at or above populations objectives for several decades. A quantitative analysis showing the jobs and labor income generated from wildlife related expenditures is included in the project record.

Economic efficiency effects (net present value) of removing improvements under alternative 1.

	Permittees	Forest Service
Improvements removed 1st year	0	-$1,4403~~6~~,000
Improvements removed over several years	0	-$1,~~339~~343,000

Economic impacts from alternative 1.

	Grazing	Wildlife and Fish – non-local visits	Forest Service
Jobs	0	75	2
	Grazing	Wildlife and Fish – non-local visits	Ecosystem Restoration
Labor Income	$0	$1,798,2000	$0

Currently there are about 34,799 AUMs permitted on the allotments in the project area. To replace this forage, the permittees would need to look for alternate forage opportunities. Leases to graze livestock are available on privately owned land within the four Wyoming counties that contain the project area. The latest 2009 figures from USDA Agricultural Marketing Service show a range of $18.00 to $25.00 per cow/calf pair ($14.99 to $20.82 per AUM) to lease private land on which to graze livestock. Under alternative 1, the estimated cost to lease private grazing for the 34,799 AUMs that would no longer be grazed on the forest ranges from $612,000 and $850,000. The lower price reflects private grazing leases where the cost of building and maintaining range improvements is similar to those on Forest Service grazing permits.

Research done at the University of Wyoming indicates that a 100% reduction in federal AUMS for ranches dependent upon federal grazing can expect about a 90% reduction in ranch profits (Taylor 2005, 2006). This correlates with the approximately tenfold increase in the cost to provide pasture forage for the livestock. Some operators may adapt to the loss of the federal rangeland currently available to them but a likely result would be that some marginal livestock operations could not bear the increased costs and would cease to operate. Under these circumstances, the assets of the livestock operation are sold off. The land assets would likely be subdivided into smaller parcels and sold for residential development. This analysis provides no information about which, if any, operations might be so affected due to the lack of complete information about the financial health of any individual livestock operation.

Cumulative Effects

Cumulative effects are included in the economic efficiency analysis.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

This alternative does not comply with Forest Plan Goal 2, Objective 2.c. The capability of providing forage products is not increased.

Alternative 2 – Current Management

Alternative 2 is modeled as a continuation of current management. Range structural improvements would be maintained but none would be constructed. Monitoring that is required for purposes of avoiding damage to cultural resources in included.

Direct and Indirect Effects

The following two tables display the direct economic efficiency effect and economic impacts of alternative 2.

Current management was modeled using two levels of livestock input. The first level is if livestock were present on Forest Service lands in the amount specified by the terms of the grazing permit. The other level is an average of the last five years of actual use. Actual use is determined either by use numbers provided by the permittee or the number authorized in the annual operating instructions. Permitted AUMs are 34,799 while average actual use is 25,104.

The financial analysis shows that agency income from grazing permit fees does not fully offset its costs of annual maintenance and permit administration (e.g., inspections). Permittee operations show a net profit for grazing on federal lands. Permittee costs include their annual operation and maintenance costs (e.g., transport of livestock and meetings with the Forest Service). The economic analysis includes the benefits and costs of both parties. . When both agency and permittee benefits and costs are considered, the NPV is positive.

Net Present Value by allotment for the Forest Service and permittee is available in the project record.

Economic efficiency effects (net present value) from alternative 2.

	Forest Service + Permittee	Forest Service	Permittees
Alternative 2 using permitted livestock	$3,694~~507~~,000	-$1,~~073~~024,000	$4,718~~580~~,000
Alternative 2 using actual livestock	$1,799~~696~~,000	-$1,~~193~~150,000	$2,~~889~~948,000

The table of economic impacts shows 16 grazing-related jobs that are direct result of livestock grazing at the permitted levels. This drops to 13 grazing-related jobs when livestock grazing is at the recent five-year average level.

Economic impacts from alternative 2.

Jobs				
	Grazing	Wildlife and Fish – non-local visits	Forest Service	Ecosystem Restoration
Alternative 2 using permitted livestock	16	75	11	0
Alternative 2 using actual livestock	13	75	11	0
Labor Income				
	Grazing	Wildlife and Fish – non-local visits	Forest Service	Ecosystem Restoration
Alternative 2 using permitted livestock	$195,800	$1,798,2000	$0	$0
Alternative 2 using actual livestock	$157,400	$1,798,2000	$0	$0

The economic effects as shown in the preceding tables are for continuation of the current management. The net present value, jobs, and income are what are currently occurring as direct result of this management. Thus implementing this alternative would produce no net change in net present value, jobs, or labor income.

Cumulative Effects

Cumulative effects are included in the economic efficiency analysis.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

This alternative does comply with Forest Plan Goal2, Objective 2.c.

Alternative 3 – Proposed Action

Direct and indirect effects: Due to the changes in monitoring, starting and ending dates for grazing, requirements for moving herds, possible boundary or classification changes in allotments, and other design criteria in alternative 3, it is difficult to predict the impact to ranching operations and AUM levels. Some operators may be effective in monitoring and using forage from NFS lands, while others may be unable to adapt to the new conditions.

Alternative 3 includes the costs of constructing range improvements and the costs of conducting vegetation treatments for sagebrush, aspen, and conifer encroachment. The additional range improvements increase the cost of this alternative both in the direct cost for construction and the ongoing cost for maintenance. There are no post-vegetation-treatment costs included in this analysis. It is assumed that all improvements are constructed in the first year.

Most costs and benefits are accounted for at the allotment level. There are some costs that are modeled at the project area level. Fuel and other vegetation treatments are modeled at the project level. Although the amount of treatment and general area are known, the implementation of

treatments is highly variable. It depends on weather conditions and the availability of appropriate staff. The estimated number of permitted AUMs for this alternative is 31,140.

Alternative 3 has been analyzed from the perspective of maximum implementation conditions and responses to management actions. This alternative assumes, for both the permittee and Forest Service, the cost of implementing all proposed adaptive management actions. In practice, these costs will vary depending upon the effectiveness of initial specific design criteria. To fully disclose the effects of this alternative, however, the full suite of adaptive management actions and options are assumed to occur immediately. Should monitoring during the life of this decision reveal that not all actions are required, options will be implemented only to the extent that they are actually needed.

The overall NPV and NPV for the Forest Service and the permittee is lower for the proposed action than for current management. The Forest Service NPV is impacted by the cost to construct the adaptive management range improvements and conduct vegetation treatments, increased costs for permit administration due to the adaptive management and increased costs of annual monitoring to determine the effectiveness of the adaptive management strategies. The NPV for the permittee is affected by the cost of maintaining the adaptive management structural improvements and by a decrease in the numbers or timing of livestock utilization of the forage resource.

The financial analysis shows that agency income from grazing permit fees does not fully offset its costs of annual maintenance and permit administration (e.g., inspections). Permittee operations show a net profit for grazing on federal lands. Permittee costs include their annual operation and maintenance costs (e.g. transport of livestock and meetings with the Forest Service). The economic analysis includes the benefits and costs of both parties. When both agency and permittee benefits and costs are considered, the PNV is positive.

The following tables display the direct economic efficiency effect and economic impacts of alternative 3.

Economic efficiency effects (net present value) from alternative 3.

Forest Service + Permittees	Forest Service	Permittees
$372~~734~~,000	-$3,180~~135~~,000	$3,551~~869~~,000

Table Economic impacts from alternative 3.

	Grazing	Wildlife and Fish – non-local visits	Forest Service	Ecosystem Restoration
Jobs	14	75	11	1

	Grazing	Wildlife and Fish – non-local visits	Ecosystem Restoration
Labor Income	$168,800	$1,798,2000	$27,200

Several factors are affecting the change in NPV. Costs have generally increased in this alternative due to the additional range improvements proposed. The range improvements have an initial construction cost and ongoing maintenance costs. The ecosystem restoration work as described by the fire and fuels specialist is another cost for this alternative that is not in alternative 1 or 2.

The following comparison table shows no change in jobs or labor income for wildlife-related tourism. This is because the best available science according to the recreation specialist and wildlife biologist do not indicate any change in recreation visitor days or wildlife population levels as an effect of implementing any of the alternatives.

Comparing alternative 2 and 3 shows that the non-market resources are worth at least $962,000 to $2,773,000. This is the amount the Forest Service and permittees are willing to spend to achieve the resource conditions for alternative 3, as described elsewhere in this document.

Table Error! No text of specified style in document.**-1. Comparison of economic efficiency and economic impacts by alternative.**

	Alternative 1	**Alternative 2**		**Alternative 3**
		Permitted #s *	**Actual #s ****	
NPV, FS + Permittees	NA	$3,694~~507~~,000	$1,~~696~~799,000	$~~734~~372.000
NPV, FS	-$1,~~436~~440,000 -$1,~~339~~343,000	-$1,~~073~~024,000	-$1,~~193~~150,000	-$3,~~135~~180,000
NPV, Permittees	$0	$4,~~580~~718,000	$2,~~889~~948,000	$3,~~869~~551,000
Grazing jobs	0	16	13	14
Wildlife/fish jobs	75	75	75	75
Forest Service jobs	2	11	11	11
Ecosystem restoration jobs	NA	0	0	1
Grazing labor income	$0	$195,800	$157,400	$168,800
Wildlife/fish labor income	$1,798,2000	$1,798,2000	$1,798,2000	$1,798,2000

	Alternative 1	Alternative 2		Alternative 3
		Permitted #s *	Actual #s **	
(non local visits)				
Forest Service	NA	$0	$0	NA
Ecosystem restoration labor income	$0	$0	$0	$27,200

* Calculated using permitted livestock numbers

** Calculated using actual use numbers for livestock

Cumulative Effects – Social and Economic Resources

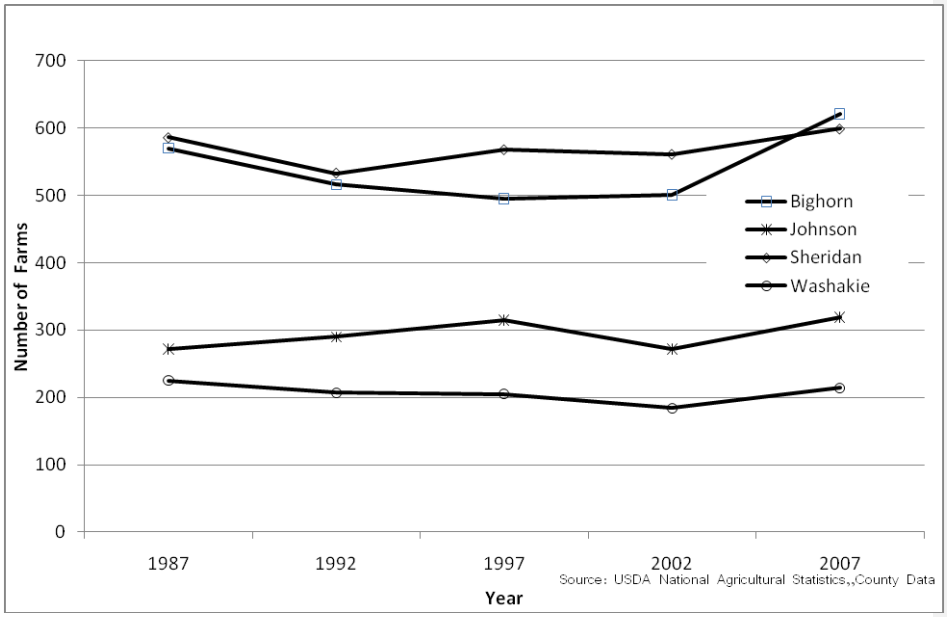
Economic efficiency analysis considers the effects of all management actions over a certain time period. For this analysis, that time period is twenty years. The Net Present Value number shown includes cumulative effects.

The economic impact analysis is for the five counties that are discussed earlier. Thus the immediate cumulative effect is contained within the analysis. Modeling the longer time frame cumulative effect is outside the scope of this analysis as projections of long-term changes in population, jobs, and changes in business and industry would need to be done.

The social cumulative effect of implementing any of these alternatives is not likely to change the national and state trends discussed earlier. These trends are for a declining economic role for livestock operations. Implementing alternative 1, with a total cessation of livestock operations on the Bighorn National Forest, might slightly accelerate those trends.

The issue of a decrease in the numbers of livestock grazed on the Bighorn NF upon the viability of livestock operation was raised during scoping. As discussed previously there had been a decrease in the past few years of permitted and authorized livestock numbers. If there was an effect than the observed decrease in livestock numbers should lead to a decrease in livestock operations. County level data gathered by the Wyoming branch of the National Agricultural Statistics Service on the number of farms was gathered and shown in the following graph.

Number of Farms for Wyoming Counties 1987-2007



Examination of this graph shows no decrease in the number of farms in the four Wyoming counties adjacent to the forest. The increase between the 2002 and 2007 numbers reflect a change in sampling. The Wyoming NASS field office started collecting more data about small hobby farms where the farm income is not the primary income source. If not for this addition the number of farms between 2002 and 2007 would be the same (Personal communication, WY NASS, 2/5/10).

For small decreases in Bighorn AUMS the data suggest that the livestock operators are not becoming unviable operations.

Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans (Heading 4)

This alternative does comply with Forest Plan Goal2, Objective 2.c.

Economic Effects of Adaptive Management Strategies

Estimating the economic effect, particularly the effect on Net Present Value, for the Bighorn Sheep Interaction Adaptive Management Strategies is not possible due to the lack of specificity in

knowledge about strategy implementation. The unknown date when a adaptive strategy would be implemented makes developing a time dependent cash flow problematic. What can be discussed is the qualitative effects of the strategies, along with some indication of the parameters that might be used to model the economic effects should a adaptive management strategy be implemented.

Estimate of costs for Adaptive Management Strategies

Adapative Management Strategy	Initial cost	Annual cost	Notes
SPOT or Other Device	$150.00	$100.00	Costs are 2011 estimates based on current market.
Temporary Fence	$1.50/ft	$0.10/ft	Estimating the cost for a temporary fence is difficult. There are many different styles of fence and the cost of the fence is related to the linear distance of fence that will be built. Neither of these details are know about the adaptive strategy. The cost presented here is for a 5 wire electric fence.
Guard dogs/ Marker Sheep	$500 Can range from $300 to $1,500	$250	There are a several breeds of guard dog and the costs vary by breed and age bought. This estimate is for a adult Great Pyrenees. A guard dog has life expectancy of 8 to 10 years with a working life of 5 to 6 years.
Telementry	$3,000 for GPS Unit Range from $300 to $3,000	$100	Wildlife telementry has a wide variation in the costs to implement. The method to use was not specified in the adaptive management action. Prior telemetry by Wyoming Game and Fish for the Devils Canyon Herd used GPS enabled

			telemetry units. Another item not specified is the number of telemetry devices to purchase for the monitoring. Somewhere between 5 to 10 units would need to be purchased. Each device has an expected life of 2 to 3 years.
Trucking	$5.00 / sheep	$5.00 / sheep	Trucking is an ongoing expense that occurs every season of use.
Move to Vacant Allotment	UNKNOWN	UNKNOWN	There are several unknowns for this strategy. Which sheep are moving where is not known. The cost to do the analysis is not known.
Remove domestic sheep	See Below		This is discussed below.

An estimate of the NPV impact of removing sheep is to look at the NPV contribution of the sheep allotments near Bighorn sheep areas. The NPV contribution of these allotments from the effects analysis is shown in the table below. The allotments included are Antelope Ridge, BeaverCreek, Bear/Crystal Creek, Hunt Mountain, Little Horn, Red Canyon and Whaley Creek.

NPV Contribution of Sheep Grazing Allotments near Bighorn Sheep

	Alternative 1	Alternative 2		Alternative 3
		Permitted #s *	Actual #s **	
NPV, FS + Permittees	NA	$213,000	$116,000	$19,000
NPV, FS	-$47,	-$160,000	-$166,000	-$242,000
NPV, Permittees	$0	$372,000	$283,000	$261,147

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For alternative 3, the sheep allotments represent about 5% of the NPV contribution.

Each of the adaptive management strategies impose additional costs with no increase in benefits. The adaptive management strategies are designed to preserve the existing benefits with no

increase in benefits. Implementing some of the adaptive management strategies could potentially lead to a overall negative return. For example a high estimate for telemetry could potentially cost $30,000 ($3,000/unit * 10 units), which is more than the combined NPV.

Monitoring Recommendations

The results from the 2010 Census should be reviewed to track whether the demographic trends continue as identified in this report.

References

Bartlett, E.T., R.G. Taylor, and J.R. McKean. Impacts of Federal Grazing on the Economy of Colorado, A report to the U.S. Forest Service, Bureau of Land Management and the Colorado State Agricultural Experiment Station, Fort Collins, Colorado, 1979.

Bartlett, E.T. "Valuing Range Forage on Public Rangelands, Proceedings: Range Economics Symposium and Workshop, Salt Lake City, Utah, USDA Forest Service,

General Technical Report, INT-149, 1983

Gee, C.K. Estimating Economic Impacts of Adjustments in Grazing on Federal Lands

and Estimating Federal Rangeland Forage Values, Technical Bulletin 143, Colorado State

University, Agricultural Experiment Station, Fort Collins, Colorado, 1981.

Gee, C.K. "The Use of Linear Programming to Estimate Range Forage Values". Proceedings: Range Economics Symposium and Workshop, Salt Lake City, Utah, USDA Forest Service, General Technical Report, INT-149, 1983.

Greer, A.J. The Nature of Federal Land Grazing Permits and Seasonal Grazing Dependencies in a Four-County Region in Southern Oregon, Oregon State University, Extension Service, Special Report 932, Corvallis Oregon, April 1994.

Hahn, W.F., T.L. Crawford, K.E. Nelson, and R.A. Bowe. Estimating Forage Values for Grazing National Forest Lands, Staff Report No. 89-51, Commodity Economics Division, Economic Research Service, USDA, Washington D.C., 1989.

Minnesota IMPLAN Group (MIG) 2002. IMPLAN Professional Version 2.0. Social accounting and impact analysis software. Stillwater, MN: Minnesota IMPLAN Group, Inc.

Perryman, J.S., C.E. Olson. Impact of Potential Changes in BLM Grazing Policies on West-Central Wyoming Cattle Ranches, University of Wyoming, Agricultural Experiment Station, Research Journal 87, Laramie, Wyoming, 1975.

Peryam, J. and C. Olson. "Impact of Potential Changes in BLM Grazing Policies on West-Central Wyoming Cattle Ranches." Wyoming Agricultural Experiment Station Research Journal No. 87, University of Wyoming: Laramie, Wyoming, 1975.

Personal communication, WY NASS, 2/5/10).

Taylor, R.G., E.T. Bartlett, and K.D. Lair. "Seasonal Dependency on Federal Forage in Colorado". Journal of Range Management, ,35(5):634-636 1982

Taylor, David T., Roger H. Coupal and Thomas Foulke. The Economic Impact of Federal Grazing on the Economy of Park County, Wyoming. University of Wyoming, Department of Agricultural and Applied Economics. Laramie, Wyoming, 2005.

Torell, L.A., J.R. Garrett, and C.T.K. Ching. "The Economic Effects of Three Changes in Public Lands Grazing Policies". Journal of Range Management, 34(5):373-376 1981

Torell, L., J. Tanaka, N. Rimby, T. Darden, L. Van Tassell, and A. Harp. Ranch-Level Impacts of Changing Grazing Policies on BLM Land to Protect the Greater Sage-Grouse:

Evidence from Idaho, Nevada, and Oregon, Policy Analysis Center for Western Public

Lands, Caldwell, Idaho, Policy Paper SG-01-02, 2002.

U.S. Census Bureau, American FactFinder. 2000. 'Profile of General Demographic Characteristics.' http://factfinder.census.gov.

U.S. Census Bureau, American FactFinder. 2000. 'Census 2000 Profile of Selected Economic Characteristics.' http://factfinder.census.gov.

U.S.D.A National Agricultural Statistic Service. 2007. 'Census of Agriculture.'

http://www.agcensus.usda.gov/index.asp

U.S.D.A National Agricultural Statistic Service. 2009, 'Wyoming Agricultural Statistics 2009'

http://www.nass.usda.gov/Statistics_by_State/Wyoming/Publications/Annual_Statistical_Bulletin/bulletin2009.pdf

Rowe, H.L., E.T. Bartlett. “Development and Federal Grazing Policy Impacts on Two Colorado Counties: A Comparative Study”. Current Issues in Rangeland Resource 2001

Van Tassell, L.W., J.W. Richardson. “Impact of Federal Grazing Reductions on Wyoming Ranches”. Stubble Height and Utilization Measurements: Uses and Misuses, Oregon State University, Agricultural Experiment Station Bulletin 682, Corvallis, Oregon, 1998